WHAT IS CLAIMED IS:

1. A transmission diffraction grating body comprising:

a base material being substantially transparent with respect to wavelength $\lambda 1$ and having a refractive index n0;

another base material being substantially transparent with respect to wavelength $\lambda 1$ and having a refractive index n1, which is formed on the base material having a refractive index n0; and

a relief diffraction grating formed on the base material having a refractive index n1; wherein:

the refractive indexes n1 and n0 satisfy the following relationship:

$$n1 > n0.$$

2. The diffraction grating body according to claim 1, wherein the diffraction grating is formed of a concave portion and a convex portion having rectangular-shaped cross sections, and the level difference h between the concave portion and the convex portion satisfies the following relationship:

$$h = \lambda 1 / (n1 - 1)$$

and the difference in an optical path between the concave portion and the convex portion is set to correspond to one wavelength with respect to the wavelength $\lambda 1$.

3. The diffraction grating body according to claim 1, wherein the refractive index n1 is 1.9 or more.

4. The diffraction grating body according to claim 1, wherein a material of the base material having the refractive index n1 is at least one material selected from the group consisting of Ta_2O_5, TiO_2, ZrO_2, Nb_2O_3, ZnS, $LiNbO_3$ and $LiTaO_3$.

5. The diffraction grating body according to claim 1, wherein the diffraction grating is formed of a concave portion and a convex portion having rectangular-shaped cross sections, and the film thickness of the base material having the refractive index n1 is the same as the level difference h between the concave portion and the convex portion.

6. The diffraction grating body according to claim 1, further comprising an anti-reflection film in the interface between the base material having a refractive index n1 and the air, and the interface between the base material having the refractive index n1 and the base material having a refractive index n0.

7. A transmission diffraction grating body, comprising a base material, and a relief diffraction grating formed on the base material, wherein the diffraction grating body is formed of a single base material; and the refractive index n1 of the single base material is 1.9 or more.

8. The diffraction grating body according to claim 7, wherein the diffraction grating is formed of a concave portion and a convex portion having rectangular-shaped cross sections, and the level difference h between the concave portion and the convex portion satisfies the following relationship:

$$h = \lambda 1 / (n1 - 1)$$

and the difference in an optical path between the concave portion and the convex portion is set to correspond to one wavelength with respect to the wavelength $\lambda 1$.

9. The diffraction grating body according to claim 7, wherein a material of the single base material is at least one material selected from the group consisting of Ta_2O_5, TiO_2, ZrO_2, Nb_2O_3, ZnS, $LiNbO_3$ and $LiTaO_3$.

10. A semiconductor laser apparatus provided with a diffraction grating body according to any one of claims 1 to 9, comprising:

a semiconductor laser for emitting a light beam with wavelength $\lambda 1$ and a light beam with wavelength $\lambda 2$; and

a photodetector for receiving the light beams emitted from the semiconductor laser and carrying out photoelectric conversion; wherein:

the diffraction grating body receives the light beam with wavelength $\lambda 2$ and transmits a main beam and generates sub-beams that are $\pm$first order diffracted light; and

the diffraction grating body, the semiconductor laser and the

photodetector are integrated into one package.

11. An optical pick-up provided with a diffraction grating body according to any one of claims 1 to 9, comprising:

a first semiconductor laser light source for emitting a light beam with wavelength λ1;

a second semiconductor laser light source for emitting a light beam with wavelength λ1;

an optical system for receiving the light beam with wavelength λ1 and the light beam with wavelength λ2 and converging the light beam onto a microspot on the optical disk;

a diffraction means for diffracting a light beam reflected from the optical disk; and

a photodetector having a photo detecting portion for receiving the diffracted light diffracted by the diffraction means to output electrical signals in accordance with the amount of the diffracted light; wherein

the diffraction grating body receives the light beam with wavelength λ2 and transmits a main beam and generates sub-beams that are ±first order diffracted light.

12. The optical pick-up according to claim 11, wherein the photo detecting portion comprises a photo detecting portion PD0 for receiving a +first order diffracted light from the diffraction means, and a distance d1 between the center of the photo detecting portion PD0 and the light emitting spot of the first semiconductor laser light source and a distance d2 between the center of the photo detecting portion PD0 and the light emitting spot of the second semiconductor laser light source substantially satisfy the following relationship:

$$\lambda 1/\lambda 2 = d1/d2.$$

13. The optical pick-up according to claim 11, wherein the diffraction grating body, the semiconductor laser and the photodetector are integrated into one package.

14. An optical information apparatus provided with the optical pick-up according to claim 11, comprising:

a focus control means with respect to an optical disk;
a tracking control means; and
an information signal detecting means; and further comprising:
a moving means for moving the optical pick-up; and
a rotation means for rotating the optical disk.